Proposed Substantive Changes to SB 1 Guidelines

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Renewables Committee Workshop

September 29, 2008

Proposed Administrative Changes

- Audits to Evaluate Operational Performance of Solar Energy Systems
- Extend Implementation Date for Chapters 3, 4, and 5 to July 1, 2009

SB 1 Assignments to Energy Commission

- **Establish Eligibility Criteria**
  - **Design, Installation and Electrical Output Standards or Incentives**
  - **Conditions for Ratepayer Incentives**
- **Set Rating Standards for Equipment, Components and Systems**

SB 1 Specific Expectations

- **High Quality Solar Energy Systems**
  - **Maximum Performance to Promote Highest Production per Ratepayer $**
- **Optimal System Performance During Peak Demand Periods**
- **Energy Efficiency in Home or Commercial Structure Where Solar is Installed**

Energy Efficiency for Newly Constructed Residential

- Update to 2008 Building Standards that Go Into Effect July 1, 2009
- Tier I – 15% Savings Total Energy
  - Matches California Green Building Standards
- Tier II – 30% Savings Total Energy and Cooling Energy
  - Promotes California Goal to Get to Zero Net Energy by 2020 (CEC, CPUC, ARB)
  - Need Big Bold Incentives For Builders

Energy Efficiency for Commercial Buildings

- **Newly Constructed Buildings**
  - **Tier I – 15% Savings Total Energy**
    - **Matches California Green Building Standards**
  - **Tier II – 30% Savings Total Energy**
    - **Promotes California Goal to Get to Zero Net Energy by 2030 (CEC, CPUC, ARB)**
- **Existing Commercial Buildings**
  - **Expect Benchmarking for PBI Systems**
    - **Consistent with AB 1103**

Other Solar Electric Generators

- PBI Only
- Full Safety Certification with Follow-up Service or Listing from NRTL
- NRTL may Develop New Test Protocol
- Eligible Listing Indicates Safety Testing Only

Meters

- **Inverter-Integrated ±5% Accuracy**
  - **Certification by NRTL Required Beginning January 1, 2010**
  - **Requirements per CSI Metering Subcommittee Test Plan**

Installer Verification

- **Alternate Installer Inspection Protocol**
  - **Visual Inspection**
  - **Polarity Check**
  - **Open Circuit Voltage and Short Circuit Current Measurement and Comparison**
  - **Based on NABCEP Recommendations**

Field Verification

- Required for PBI < 50 kW
- 1 of 7 Sampling Allowed
- Visual Inspection of Components, Installation Characteristics, Shading
- Encouraged for all PBI
- PA's may Waive Assessment of Future Shading if Disclosure Provided to System Owner

Hourly PV Production Calculation

- Allows CECPV Calculator or Other Calculator that Meets Guidelines
- Hourly Calculation, Detailed Equipment Models to Reward Optimal Performance During Peak
- Per String Shading Measurement Removed

Shading

- **Solar Availability**
  - **Monthly Solar Availability Option**
    - **20 Values**
    - **3 per Month for June through September to Capture Peak**
  - **Measurements at Major Corners**

Shading

- **Shade Impact Factor**
  - **Accounts for Disproportionate Effect of Partial Shading on PV Production**
  - **Default Value = 2**
  - **Technologies Demonstrating Effective Partial Shading Tolerance will be Considered for Lower Shade Impact Factor**

Shade Impact Factor (SIF) Considerations

Tim Townsend

BEW Engineering

Renewables Committee Workshop

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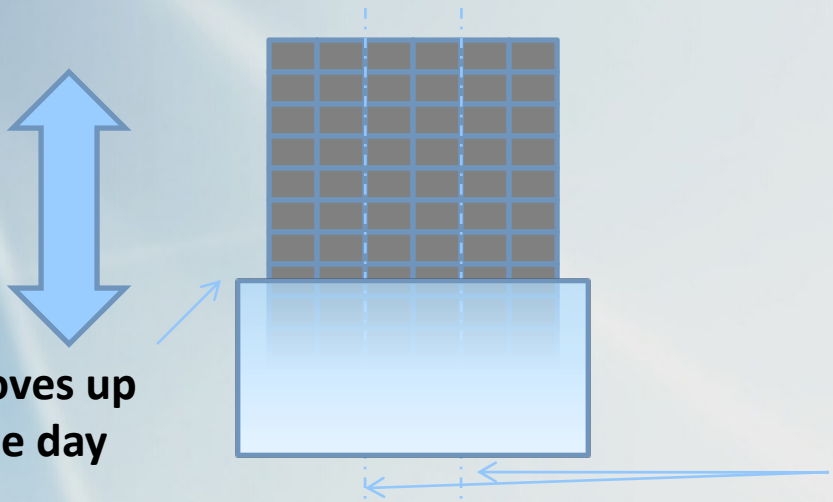
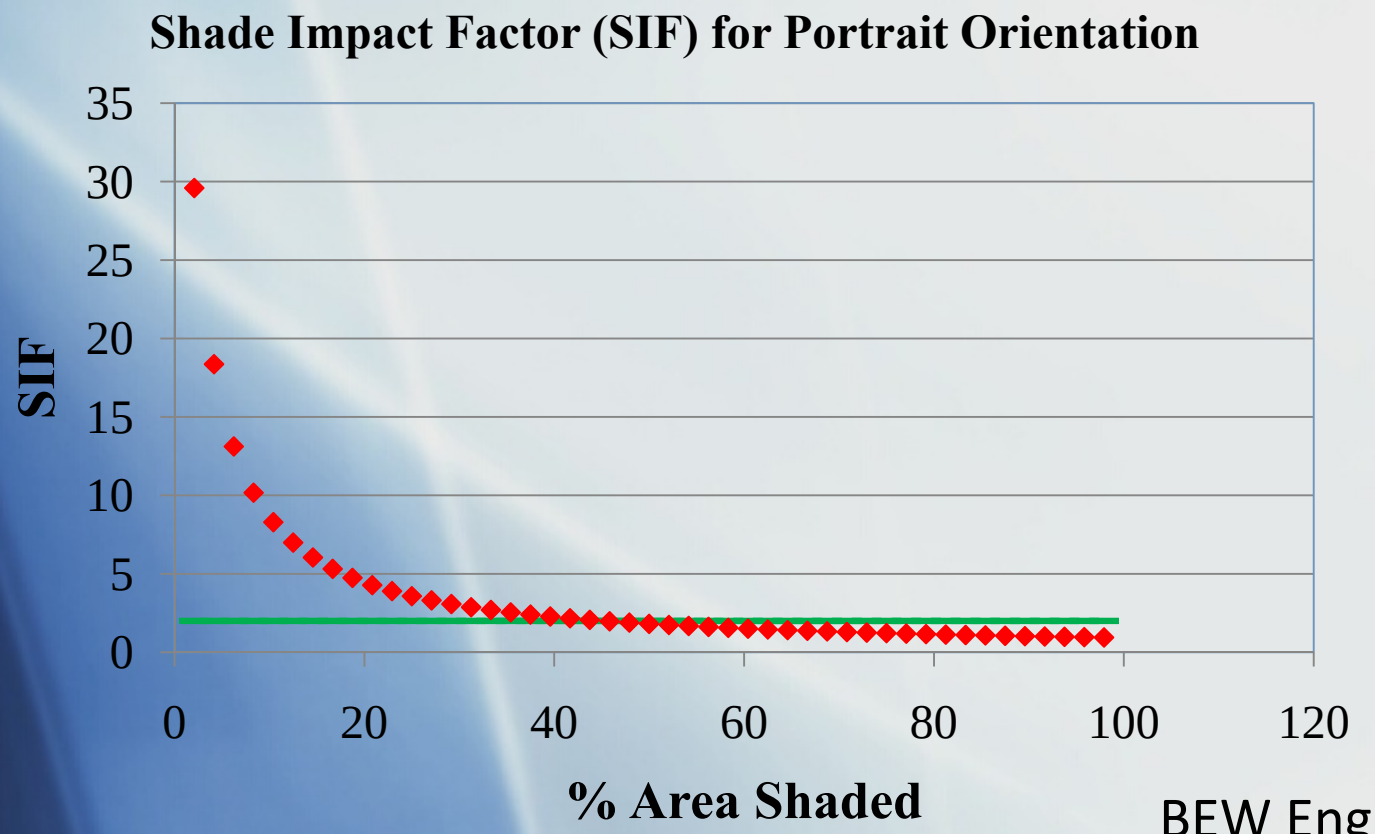


Shade line moves up or down as the day progresses

Dashed lines indicate bypass diode location



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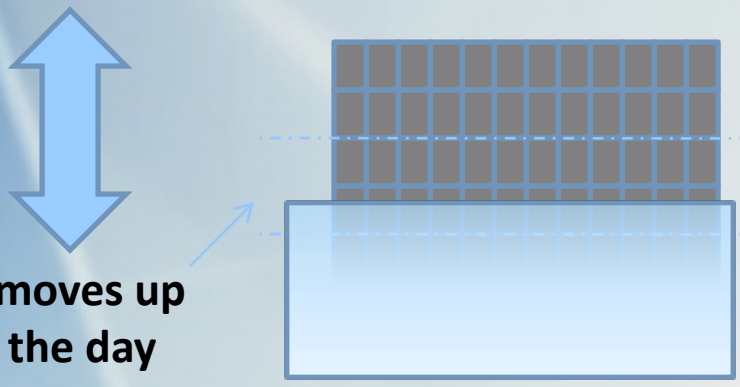

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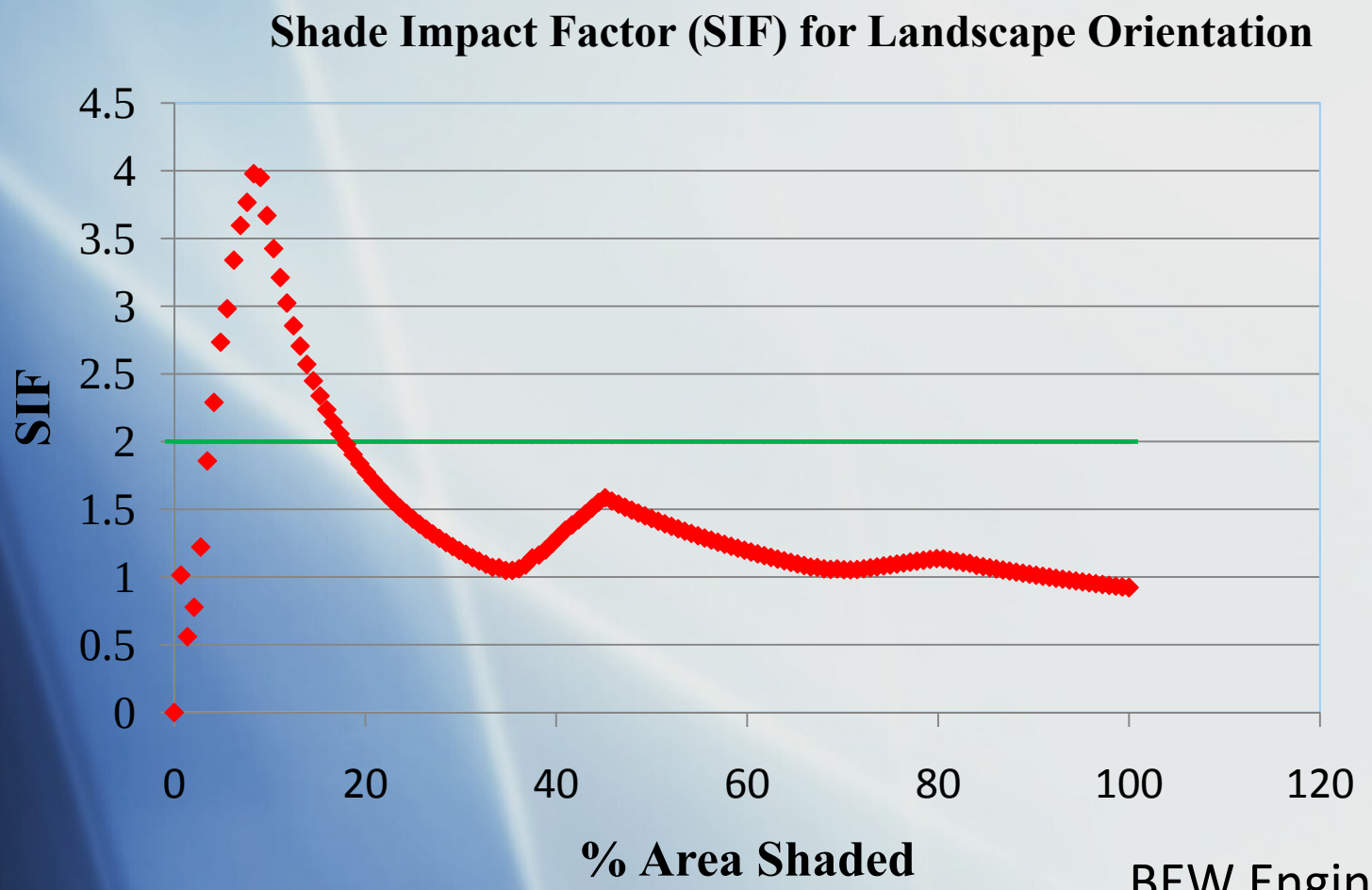

BEW Engineering

Annual Shade Loss Results
SIF = 2.1 ≈ 2

- Simulation w/PVSYST
- Sacramento
- 30 degree tilt
- South-facing
- Portrait modules
- 30 kW
- 175 watt modules
- Row Spacing 2:1 setback

- Area-related shade loss
  - 3.2%
  - Corresponds to shade impact factor 1.0 (status quo treatment)
- Shading loss analysis
  - 6.6%
  - Assumes circuit is limited to shaded region whenever shade is 1/12th of area or more

PUBLIC COMMENTS

Next Steps

- **Oct 6: Written Comments Deadline**
- **Nov 4: Release Notice of Adoption and Proposed Final Guidelines**
- **Nov 19: Business Meeting Adoption**